

Keekor Environmental Products
TankTite Leak Detection Kernel Version 1.0 with Keeprobe K7
(Magnetostrictive Probe)
AUTOMATIC TANK GAUGING SYSTEM

Certification:	Leak rate of 0.2 gph with $P_D=95.4\%$ and $P_{FA}=4.6\%$.
Leak Threshold:	0.1 gph. A system should not be declared tight if the test result indicates a loss or gain that equals or exceeds this threshold.
Applicability:	Gasoline, diesel, aviation fuel, fuel oils #4 and #6, waste oil, and solvents.
Tank Capacity:	Maximum of 15,000 gallons. Tank must be between 50 and 90% full.
Waiting Time:	Minimum of 8 hours, 6 minutes between delivery and testing. Minimum of 15 minutes after a maximum dispensing rate of 50 gallons per minute. There must be no delivery during waiting time.
Test Period:	Minimum of 3 hours. Test data are acquired and recorded by a computer. Leak rate is calculated as the average of subsets of all data collected. There must be no dispensing or delivery during test.
Temperature:	Average for product is determined by a minimum of 5 resistance temperature detectors (RTDs).
Water Sensor:	Must be used to detect water ingress. Minimum detectable water level in the tank is 0.41 inch. Minimum detectable water level change is 0.0013 inch.
Calibration:	Execution of Probe Check diagnostic routine is recommended prior to leak detect tests to ensure sensor is fully operational and in calibration. Annual preventative maintenance should be performed per manufacturer's instructions.
Comments:	Not evaluated using manifold tank systems. Tests only portion of tank containing product. As product level is lowered, leak rate in a leaking tank decreases (due to lower head pressure). Consistent testing at low levels could allow a leak to remain undetected. EPA leak detection regulations require testing of the portion of the tank system which routinely contains product. California regulations require at least one test per month after routine product delivery or when the tank is filled to within 10% of the highest operating level during the previous month.

Keekor Environmental Products
14806 N. 74th St.
Scottsdale, AZ 85267-4830
Tel: (602) 443-0001

Evaluator: Arizona State University
Tel: (602) 965-3185

Date of Evaluation: 10/25/94

Leak Detection Systems, Inc.

Tank Auditor, Version RTD V.2.16

VOLUMETRIC TANK TIGHTNESS TEST METHOD (OVERFILL)

- Certification:** Leak rate of 0.1 gph with $P_D=99.98\%$ and $P_{FA}=0.02\%$.
- Leak Threshold:** 0.05 gph. A system should not be declared tight if the test result indicates a loss or gain that equals or exceeds this threshold, except as noted below.
If using two level testing, the level is changed by 3 feet between the two tests and a system should not be declared tight if the net change between the two tests is greater than 0.02 gph.
- Applicability:** Gasoline, diesel, aviation fuel, fuel oil #4, waste oil, and solvents.
Other liquids may be tested after consultation with the manufacturer.
- Tank Capacity:** Maximum of 15,000 gallons.
Tank must be minimum 100% full.
- Waiting Time:** Minimum is variable depending on site conditions, but not be less than 6 hours between delivery and testing.
Minimum of 1 hour between "topping off" and testing.
There must be no dispensing or delivery during waiting time.
- Test Period:** Minimum of 1 hour.
Test data are acquired and recorded by a computer.
Leak rate calculated from data determined to be valid by statistical analysis.
There must be no dispensing or delivery during test.
- Temperature:** Average for product is determined by a temperature averaging probe.
- Groundwater:** If depth to groundwater cannot be determined, two tests must be performed with a level change of at least 3 feet between tests. If depth to groundwater in backfill can be determined and it is above bottom of the tank, product level must be adjusted to provide height differential of 3 feet between product and groundwater in backfill during test.
- Calibration:** Temperature averaging probe and level sensors must be calibrated before each test.
- Comments:** Not evaluated using manifold tank systems.
Evaluation of system did not include a field evaluation of groundwater compensation by two level testing.

Leak Detection Systems, Inc.
106 Longwater Dr.
Norwell, MA 02061
Tel: (617) 878-7766

Evaluator: Ken Wilcox Associates
Tel: (816) 443-2494

Date of Evaluation: 11/29/91

Mallory Controls**Pollulert Probes MD221G/T, MD221G/TRA****LIQUID-PHASE OUT-OF-TANK PRODUCT DETECTOR****Detector:**

Output type: qualitative
 Sampling frequency: continuous
 Operating principle: electrical conductivity

Test Results:

	unleaded <u>gasoline</u>	synthetic <u>gasoline</u>	JP-4 <u>jet fuel</u>
Accuracy (%)	100	100	100
Detection time (sec)	4	7	2
Fall time (sec)	3	4	4
Lower detection limit (cm)	0.08-0.32	0.08-0.32	0.08-0.32

Specificity Results:

Activated: unleaded gasoline, synthetic gasoline, n-hexane, diesel fuel, jet-A fuel, JP-4 jet fuel, toluene, xylene(s).

Comments:

EPA and many states require detection of 1/8 inch (0.32 cm) of product for groundwater monitoring. Evaluation was conducted using probe FD221G/TRA.

According to manufacturer, probes beginning with "MD" have identical performance as older probes beginning with "FD."

Test procedures used were Radian Corporation's draft report "Development of Procedures to Assess the Performance of External Leak Detection Devices: Liquid-Phase ASTM-Formatted Methods," June 29, 1990.

Detector is reusable.

Detector has been discontinued by manufacturer.

Mallory Controls no longer offers service or technical support for leak detection products.

Mallory Controls
 2831 Waterfront Pkwy. E. Dr.
 Indianapolis, IN 46214
 Tel: (317) 328-4000

Evaluator: Radian Corp.
 Tel: (512) 454-4797

Date of Evaluation: 07/08/91

Mallory Controls**Pollulert Probes MD241R, MD241RRA, MD241G, MD241GRA****LIQUID-PHASE OUT-OF-TANK PRODUCT DETECTOR****Detector:**

Output type: qualitative
 Sampling frequency: continuous
 Operating principle: electrical conductivity

Test Results:

	unleaded <u>gasoline</u>	synthetic <u>gasoline</u>	JP-4 <u>jet fuel</u>
Accuracy (%)	100	100	100
Detection time (sec)	2	2	1
Fall time (sec)	1	2	2
Lower detection limit (cm)	0.16-0.32	0.16-0.32	0.16-0.32

Specificity Results:

Activated: unleaded gasoline, synthetic gasoline, n-hexane, diesel fuel, jet-A fuel, JP-4 jet fuel, toluene, xylene (s).

Comments:

EPA and many states require detection of 1/8 inch (0.32 cm) of product for groundwater monitoring.

Evaluation was conducted using probe FD241R.

According to manufacturer, probes beginning with "MD" have identical performance as older probes beginning with "FD."

Test procedures used were Radian Corporation's draft report "Development of Procedures to Assess the Performance of External Leak Detection Devices: Liquid-Phase ASTM-Formatted Methods," June 29, 1990.

Detector is reusable.

Detector has been discontinued by manufacturer.

Mallory Controls no longer offers service or technical support for leak detection products.

Mallory Controls
 2831 Waterfront Pkwy. E. Dr.
 Indianapolis, IN 46214
 Tel: Not available

Evaluator: Radian Corp.
 Tel: (512) 454-4797

Date of Evaluation: 07/08/91

Mallory Controls**Pollulert Probes MD221V, MD221VRA, MD210V, MD210VRA****VAPOR-PHASE OUT-OF-TANK PRODUCT DETECTOR****Detector:**

Output type: qualitative
 Sampling frequency: continuous
 Operating principle: adsistor

Test Results:

	<u>unleaded gasoline</u>	<u>synthetic gasoline</u>	<u>JP-4 jet fuel</u>
Accuracy (%)	100	100	100
Detection time (sec)	91	65	86
Fall time (min:sec)	5:39	4:23	9:38
Lower detection limit (ppm)	10 to 100	10 to 500	10 to 50

Specificity Results:

Activated: unleaded gasoline, synthetic gasoline, JP-4 jet fuel, toluene, xylene(s).

Not Activated: n-hexane.

Comments:

Evaluation was conducted using probe FD221V.

According to manufacturer, probes beginning with "MD" have identical performance as older probes beginning with "FD."

Test procedures used were Radian Corporation's draft report "Development of Procedures to Assess the Performance of External Leak Detection Devices: Vapor-Phase ASTM-Formatted Methods," June 29, 1990.

Detector has been discontinued by manufacturer.

Mallory Controls no longer offers service or technical support for leak detection products.

Mallory Controls
 2831 Waterfront Pkwy. E. Dr.
 Indianapolis, IN 46214
 Tel: Not available.

Evaluator: Radian Corp.
 Tel: (512) 454-4797

Date of Evaluation: 07/08/91

Marley Pump Co.**Red Jacket PPM 4000, RLM 9000, ST 1401L, and ST1801L****AUTOMATIC ELECTRONIC LINE LEAK DETECTOR**

Certification:	Leak rate of 3.0 gph with $P_D=100\%$ and $P_{FA}=0\%$.
Leak Threshold:	2.0 gph. A system should not be declared tight if the test result indicates a loss that equals or exceeds this threshold.
Applicability:	Gasoline, diesel, aviation fuel, solvents, methanol, ethanol, and gasoline blends with methanol and ethanol.
Specification:	System tests pressurized fiberglass and steel pipelines. Tests are conducted at 5-10 psi.
Pipeline Capacity:	Maximum of 55.1 gallons.
Waiting Time:	None between delivery and testing. None between dispensing and testing.
Test Period:	Response time is 2 minutes. Test data are acquired and recorded by a microprocessor. Calculations are automatically performed by the microprocessor.
System Features:	Permanent installation on pipeline. Automatic testing of pipeline. Preset threshold. Single test to determine if pipeline is leaking. Recording and display of day, date, and time of conclusive test. Dispenser shutdown, message display, and alarm activation if leak is declared.
Calibration:	System must be checked annually and calibrated if necessary in accordance with manufacturer's instructions.
Comments:	PPM 4000 is a stand alone automatic electronic line leak detector. RLM 9000 is a combination of RLM 5000 and PPM 4000 automatic electronic line leak detectors. ST1401L is a combination of ST 1400 automatic tank gauge and the ST 1401L automatic electronic line leak detector. ST 1801L is a combination of ST1800 automatic tank gauge and ST 1801L automatic electronic line leak detector.

Marley Pump Co.
9650 Alden Street
Lenexa, KS 66215
Tel: (888) 262-7539

Evaluator: Ken Wilcox Associates
Tel: (816) 443-2494

Date of Evaluation: 03/07/91, Rev. 04/94

Marley Pump Co.

Red Jacket PPM 4000, RLM 9000

AUTOMATIC ELECTRONIC LINE LEAK DETECTOR

Certification:	Leak rate of 0.2 gph with $P_D=100\%$ and $P_{FA}=0\%$.
Leak Threshold:	0.1 gph. A system should not be declared tight if the test result indicates a loss that equals or exceeds this threshold.
Applicability:	Gasoline, diesel, aviation fuel, solvents, methanol, ethanol, and gasoline blends with methanol and ethanol.
Specification:	System tests pressurized fiberglass and steel pipelines. Tests are conducted at 5-10 psi.
Pipeline Capacity:	Maximum of 55.1 gallons.
Waiting Time:	None between delivery and testing. None between dispensing and testing.
Test Period:	Response time is 10 minutes to 3 hours. Test data are acquired and recorded by a microprocessor. Calculations are automatically performed by the microprocessor.
System Features:	Permanent installation on pipeline. Automatic testing of pipeline. Preset threshold. Single test to determine if pipeline is leaking. Recording and display of day, date, and time of conclusive test. Dispenser shutdown, message display, and alarm activation if leak is declared.
Calibration:	System must be checked annually and calibrated if necessary in accordance with manufacturer's instructions.
Comments:	PPM 4000 is a stand alone automatic electronic line leak detector. RLM 9000 is a combination of RLM 5000 automatic tank gauge and PPM 4000 automatic electronic line leak detector.

Marley Pump Co.
9650 Alden Street
Lenexa, KS 66215
Tel: (888) 262-7539

Evaluator: Ken Wilcox Associates
Tel: (816) 443-2494

Date of Evaluation: 03/07/91, Rev. 04/94

Marley Pump Co.**Red Jacket PPM 4000, RLM 9000****AUTOMATIC ELECTRONIC LINE LEAK DETECTOR**

Certification:	Leak rate of 0.1 gph with $P_D=100\%$ and $P_{FA}=0\%$.
Leak Threshold:	0.047 gph. A system should not be declared tight if the test result indicates a loss that equals or exceeds this threshold.
Applicability:	Gasoline, diesel, aviation fuel, solvents, methanol, ethanol, and gasoline blends with methanol and ethanol.
Specification:	System tests pressurized fiberglass and steel pipelines. Tests are conducted at 5-10 psi.
Pipeline Capacity:	Maximum of 55.1 gallons.
Waiting Time:	None between delivery and testing. None between dispensing and testing.
Test Period:	Response time is 2 hours, 30 minutes to 3 hours. Test data are acquired and recorded by a microprocessor. Calculations are automatically performed by the microprocessor.
System Features:	Permanent installation on pipeline. Automatic testing of pipeline. Preset threshold. Single test to determine if pipeline is leaking. Recording and display of day, date, and time of conclusive test. Dispenser shutdown, message display, and alarm activation if leak is declared.
Calibration:	System must be checked annually and calibrated if necessary in accordance with manufacturer's instructions.
Comments:	PPM 4000 is a stand alone automatic electronic line leak detector. RLM 9000 is a combination of RLM 5000 automatic tank gauge and PPM 4000 automatic electronic line leak detector.

Marley Pump Co.
9650 Alden Street
Lenexa, KS 66215
Tel: (888) 262-7539

Evaluator: Ken Wilcox Associates
Tel: (816) 443-2494

Date of Evaluation: 03/07/91, Rev. 04/94

Marley Pump Co.

Red Jacket PPM 4000, RLM 9000, ST 1401L, and ST 1801L
 (for Flexible Pipelines)
AUTOMATIC ELECTRONIC LINE LEAK DETECTOR

Certification:	Leak rate of 0.2 gph with $P_D=100\%$ and $P_{FA}=0\%$.
Leak Threshold:	0.1 gph. A system should not be declared tight if the test result indicates a loss that equals or exceeds this threshold.
Applicability:	Gasoline, diesel, aviation fuel, solvents, methanol, ethanol, and gasoline blends with methanol and ethanol.
Specification:	System tests pressurized flexible pipelines. Tests are conducted at 10 to 12 psi.
Pipeline Capacity:	Maximum of 27.6 gallons.
Waiting Time:	None between delivery and testing. None between dispensing and testing.
Test Period:	Response time is 9 minutes to 2 hours, 30 minutes. Test data are acquired and recorded by a microprocessor. Calculations are automatically performed by the microprocessor.
System Features:	Permanent installation on pipeline. Automatic testing of pipeline. Preset threshold. Single test to determine if pipeline is leaking. Recording and display of day, date, and time of conclusive test. Dispenser shutdown, message display, and alarm activation if leak is declared.
Calibration:	System must be checked annually and calibrated if necessary in accordance with manufacturer's instructions.
Comments:	PPM 4000 is a stand alone automatic electronic line leak detector. RLM 9000 is a combination of RLM 5000 automatic tank gauge and PPM 4000 automatic electronic line leak detector. ST 1401L is a combination of ST 1400 automatic tank gauge and ST 1401L automatic electronic line leak detector. ST1801L is a combination ST1800 automatic tank gauge and ST1801L automatic electronic line leak detector.

Marley Pump Co.
 9650 Alden Street
 Lenexa, KS 66215
 Tel: (888) 262-7539

Evaluator: Ken Wilcox Associates
 Tel: (816) 443-2494

Date of Evaluation: 07/28/96, Rev. 01/31/97

Marley Pump Co.

Red Jacket PPM 4000, RLM 9000, ST 1401L, and ST 1801L
 (for flexible pipelines)
AUTOMATIC ELECTRONIC LINE LEAK DETECTOR

Certification:	Leak rate of 0.1 gph with $P_D=100\%$ and $P_{FA}=0\%$.
Leak Threshold:	0.05 gph. A system should not be declared tight if the test result indicates a loss that equals or exceeds this threshold.
Applicability:	Gasoline, diesel, aviation fuel oil #4, solvents, methanol, ethanol, and gasoline blends with methanol and ethanol.
Specification:	System tests pressurized flexible pipelines. Tests are conducted at operating pressure to the equivalence of 45 psi.
Pipeline Capacity:	Maximum of 27.6 gallons.
Waiting Time:	None between delivery and testing. None between dispensing and testing.
Test Period:	Response time is 26 minutes to 4 hours. Test data are acquired and recorded by a microprocessor. Calculations are automatically performed by the microprocessor.
System Features:	Permanent installation on pipeline. Automatic testing of pipeline. Preset threshold. Single test to determine if pipeline is leaking. Recording and display of day, date, and time of conclusive test. Dispenser shutdown, message display, and alarm activation if leak is declared.
Calibration:	System must be checked annually and calibrated if necessary in accordance with manufacturer's instructions.
Comments:	PPM 4000 is a stand alone automatic electronic line leak detector. RLM 9000 is a combination of RLM 5000 automatic tank gauge and PPM 4000 automatic electronic line leak detector. ST 1401L is a combination of ST 1400 automatic tank gauge and ST 1401L automatic line leak detector. ST 1801L is a combination of ST 1800 automatic tank gauge and ST 1801L automatic line leak detector.

Marley Pump Co.
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 Tel: (888) 262-7539

Evaluator: Ken Wilcox Associates
 Tel: (816) 443-2494

Date of Evaluation: 07/28/96, Rev. 01/31/97

Marley Pump Co.**Red Jacket ST 1401L and ST 1801L, CPT and PRO-Link****AUTOMATIC ELECTRONIC LINE LEAK DETECTOR**

Certification:	Leak rate of 0.2 gph with $P_D=100\%$ and $P_{FA}=0\%$.
Leak Threshold:	0.1 gph. A system should not be declared tight if the test result indicates a loss that equals or exceeds this threshold.
Applicability:	Gasoline, diesel, aviation fuel, solvents, methanol, ethanol, and gasoline blends with methanol and ethanol.
Specification:	System tests pressurized fiberglass and steel pipelines. Tests are conducted at operating pressure equivalent to 30 psi.
Pipeline Capacity:	Maximum of 163 gallons.
Waiting Time:	None between delivery and testing. None between dispensing and testing.
Test Period:	Response time is 2 minutes to 4 hours. Test data are acquired and recorded by a microprocessor. Calculations are automatically performed by the microprocessor.
System Features:	Permanent installation on pipeline. Automatic testing of pipeline. Preset threshold. Single test to determine if pipeline is leaking. Recording and display of day, date, and time of conclusive test. Dispenser shutdown, message display, and alarm activation if leak is declared.
Calibration:	System must be checked annually and calibrated if necessary in accordance with manufacturer's instructions.
Comments:	ST 1401L is a combination of ST 1400 automatic tank gauge and ST 1401L automatic electronic line leak detector. ST 1801L is a combination of ST 1800 automatic tank gauge and ST 1801L automatic electronic line leak detector. CPT is an electronic line leak detector component. Pro-Link is a combination of an automatic tank gauge and an automatic electronic line leak detector.

Marley Pump Co.
9650 Alden Street
Lenexa, KS 66215
Tel: (888) 262-7539

Evaluator: Ken Wilcox Associates
Tel: (816) 443-2494

Date of Evaluation: 07/28/96, Rev. 01/31/97

Marley Pump Co.**Red Jacket ST 1401L, and ST1801L, CPT and Pro-Link****AUTOMATIC ELECTRONIC LINE LEAK DETECTOR**

Certification:	Leak rate of 0.1 gph with $P_D=100\%$ and $P_{FA}=0\%$.
Leak Threshold:	0.047 gph. A system should not be declared tight if the test result indicates a loss that equals or exceeds this threshold.
Applicability:	Gasoline, diesel, aviation fuel, solvents, methanol, ethanol, and gasoline blends with methanol and ethanol.
Specification:	System tests pressurized fiberglass and steel pipelines. Tests are conducted at 10-20 psi.
Pipeline Capacity:	Maximum of 163 gallons.
Waiting Time:	None between delivery and testing. None between dispensing and testing.
Test Period:	Response time is 4 minutes to 4 hours, 45 minutes. Test data are acquired and recorded by a microprocessor. Calculations are automatically performed by the microprocessor.
System Features:	Permanent installation on pipeline. Automatic testing of pipeline. Preset threshold. Single test to determine if pipeline is leaking. Recording and display of day, date, and time of conclusive test. Dispenser shutdown, message display, and alarm activation if leak is declared.
Calibration:	System must be checked annually and calibrated if necessary in accordance with manufacturer's instructions.
Comments:	The ST1401L is a combination of ST 1400 automatic tank gauge and ST 1401L automatic electronic line leak detector. The ST 1801L is a combination of ST1800 automatic tank gauge and ST 1801L automatic electronic line leak detector. CPT is an electronic line leak detector component. Pro-Link is a combination of an automatic tank gauge and an automatic electronic line leak detector.

Marley Pump Co.
9650 Alden Street
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Tel: (888) 262-7539

Evaluator: Ken Wilcox Associates
Tel: (816) 443-2494

Date of Evaluation: 07/28/96, Rev. 01/31/97

Marley Pump Co.

Red Jacket DLD and XLD

AUTOMATIC MECHANICAL LINE LEAK DETECTOR

Certification:	Leak rate of 3.0 gph with $P_D=100\%$ and $P_{FA}=0\%$.
Leak Threshold:	2.0 gph. A system should not be declared tight if the test result indicates a loss that equals or exceeds this threshold.
Applicability:	Gasoline, diesel, aviation fuel and solvents.
Specification:	System tests pressurized fiberglass and steel pipelines. Tests are conducted at 8-12 psi.
Pipeline Capacity:	Maximum of 129 gallons.
Waiting Time:	None between delivery and testing. None between dispensing and testing.
Test Period:	Response time is 6 seconds.
System Features:	Permanent installation on pipeline. Automatic testing of pipeline. Preset threshold. Single test to determine if pipeline is leaking. Restricted flow to dispenser if leak is declared.
Calibration:	System must be checked annually for capability of detecting a line leak of 3.0 gph.

Marley Pump Co.
9650 Alden Street
Lenexa, KS 66215
Tel: (888) 262-7539

Evaluator: Ken Wilcox Associates
Tel: (816) 443-2494

Date of Evaluation: 12/21/90

Marley Pump Co.

Red Jacket FX1/FX2

AUTOMATIC MECHANICAL LINE LEAK DETECTOR

Certification:	Leak rate of 3.0 gph with $P_D=100\%$ and $P_{FA}=0\%$.
Leak Threshold:	2.0 gph. A system should not be declared tight if the test result indicates a loss that equals or exceeds this threshold.
Applicability:	Gasoline, diesel, aviation fuel, and some solvents.
Specification:	System tests pressurized fiberglass and steel pipelines. Tests are conducted at 8-12 psi.
Pipeline Capacity:	Maximum of 316 gallons for FX1 and 362 gallons for FX2.
Waiting Time:	None between delivery and testing. None between dispensing and testing. Stabilization time up to 45 minutes may be required after dispensing when temperature extremes are present.
Test Period:	Response time is less than 5 minutes.
System Features:	Permanent installation on pipeline. Automatic testing of pipeline. Preset threshold. Single test to determine if pipeline is leaking. Restricted flow to dispenser if leak is declared.
Calibration:	System must be checked annually for capability of detecting a line leak of 3.0 gph.

Marley Pump Co.
9650 Alden Street
Lenexa, KS 66215
Tel: (888) 262-7539

Evaluator: Ken Wilcox Associates
Tel: (816) 443-2494

Date of Evaluation: 03/14/94, Rev. 06/01/94

Marley Pump Co.

**Red Jacket FX1/FX2 Flexline
(for Flexible Pipelines)**

AUTOMATIC MECHANICAL LINE LEAK DETECTOR

Certification:	Leak rate of 3.0 gph with $P_D=100\%$ and $P_{FA}=0\%$.
Leak Threshold:	2.0 gph. A system should not be declared tight if the test result indicates a loss that equals or exceeds this threshold.
Applicability:	Gasoline, diesel, aviation fuel, and some solvents.
Specification:	System tests pressurized flexible pipelines.
Pipeline Capacity:	Maximum of 49 gallons.
Waiting Time:	None between delivery and testing. None between dispensing and testing.
Test Period:	Response time is less than 3 minutes.
System Features:	Permanent installation on pipeline. Automatic testing of pipeline. Preset threshold. Single test to determine if pipeline is leaking. Restricted flow to dispenser if leak is declared.
Calibration:	System must be checked annually for capability of detecting a line leak of 3.0 gph.
Comments:	Enviroflex pipeline with a bulk modulus* of 1,280 psi was used during this evaluation. To perform a valid test, time delays must be integrated into electronic dispensing equipment or retrofitted in junction box. Without this delay, there is no guarantee that a nozzle will be closed for sufficient time to allow leak detector to perform pipeline test and provide uninterrupted service.

*See glossary.

Marley Pump Co.
9650 Alden Street
Lenexa, KS 66215
Tel: (888) 262-7539

Evaluator: Ken Wilcox Associates
Tel: (816) 443-2494

Date of Evaluation: 03/22/94

Marley Pump Co.

**Red Jacket FX1D, FX2D, FX2DV
Installed in the Big-Flow**

AUTOMATIC MECHANICAL LINE LEAK DETECTOR

Certification:	Leak rate of 3.0 gph with $P_D=100\%$ and $P_{FA}=0\%$.
Leak Threshold:	2.0 gph. A system should not be declared tight if the test result indicates a loss that equals or exceeds this threshold.
Applicability:	Gasoline, diesel, aviation fuel, and solvents.
Specification:	System tests pressurized fiberglass and steel pipelines. Tests are conducted at operating pressure.
Pipeline Capacity:	Maximum of 362 gallons.
Waiting Time:	None between delivery and testing. None between dispensing and testing.
Test Period:	Response time is less than 3 minutes.
System Features:	Permanent installation on pipeline. Automatic testing of pipeline. Preset threshold. Single test to determine if pipeline is leaking. Restricted flow to dispenser if leak is declared.
Calibration:	System must be checked annually for capability of detecting a line leak of 3.0 gph.

Marley Pump Co.
9650 Alden Street
Lenexa, KS 66215
Tel: (888) 262-7539

Evaluator: Ken Wilcox Associates
Tel: (816) 443-2494

Date of Evaluation: 03/15/94, Rev. 07/30/96

Marley Pump Co.

Red Jacket XLP

AUTOMATIC MECHANICAL LINE LEAK DETECTOR

Certification:	Leak rate of 3.0 gph with $P_D=100\%$ and $P_{FA}=0\%$.
Leak Threshold:	2.0 gph. A system should not be declared tight if the test result indicates a loss that equals or exceeds this threshold.
Applicability:	Gasoline, diesel, aviation fuel and solvents.
Specification:	System tests pressurized fiberglass and steel pipelines. Tests are conducted at 15-22 psi.
Pipeline Capacity:	Maximum of 129 gallons.
Waiting Time:	None between delivery and testing. None between dispensing and testing.
Test Period:	Response time is 6 seconds.
System Features:	Permanent installation on pipeline. Automatic testing of pipeline. Preset threshold. Single test to determine if pipeline is leaking. Restricted flow to dispenser if leak is declared.
Calibration:	System must be checked annually for capability of detecting a line leak of 3.0 gph.

Marley Pump Co.
9650 Alden Street
Lenexa, KS 66215
Tel: (888) 262-7539

Evaluator: Ken Wilcox Associates
Tel: (816) 443-2494

Date of Evaluation: 03/22/94

Marley Pump Co.

**Red Jacket XLP
(for Flexible Pipelines)**

AUTOMATIC MECHANICAL LINE LEAK DETECTOR

Certification:	Leak rate of 3.0 gph with $P_D=100\%$ and $P_{FA}=0\%$.
Leak Threshold:	2.0 gph. A system should not be declared tight if the test result indicates a loss that equals or exceeds this threshold.
Applicability:	Gasoline, diesel, aviation fuel and solvents.
Specification:	System tests pressurized flexible pipelines. Tests are conducted at operating pressure.
Pipeline Capacity:	Maximum of 48.9 gallons.
Waiting Time:	None between delivery and testing. None between dispensing and testing.
Test Period:	Response time is less than 3 minutes.
System Features:	Permanent installation on pipeline. Automatic testing of pipeline. Preset threshold. Single test to determine if pipeline is leaking. Restricted flow to dispenser if leak is declared.
Calibration:	System must be checked annually for capability of detecting a line leak of 3.0 gph.

Marley Pump Co.
9650 Alden Street
Lenexa, KS 66215
Tel: (888) 262-7539

Evaluator: Ken Wilcox Associates
Tel: (816) 443-2494

Date of Evaluation: 04/19/93

Marley Pump Co.

**Red Jacket ATM System,
Version RLM 5000, 5001, and 9000
(Magnetostrictive Probe)
AUTOMATIC TANK GAUGING SYSTEM**

- Certification:** Leak rate of 0.2 gph with $P_D=100\%$ and $P_{FA}=0\%$.
- Leak Threshold:** 0.1 gph. A system should not be declared tight if the test result indicates a loss or gain that equals or exceeds this threshold.
- Applicability:** Gasoline, diesel, aviation fuel, and solvents.
- Tank Capacity:** Maximum of 15,000 gallons.
Tank must be between 50 and 95% full.
- Waiting Time:** Minimum of 6 hours between delivery and testing.
There must be no dispensing or delivery during waiting time.
- Test Period:** Minimum of 3 hours.
Test data are acquired and recorded by a computer.
Leak rate is calculated from all data collected.
There must be no dispensing or delivery during test.
- Temperature:** Average for product is determined by a minimum of 5 temperature sensors.
- Water Sensor:** Must be used to detect water ingress.
Minimum detectable water level in the tank is 1.04 inches.
Minimum detectable water level change is 0.011 inch.
- Calibration:** Temperature sensors and probe must be checked and calibrated in accordance with manufacturer's instructions.
- Comments:** Not evaluated using manifold tank systems.
Tests only portion of tank containing product.
As product level is lowered, leak rate in a leaking tank decreases (due to lower head pressure). Consistent testing at low levels could allow a leak to remain undetected.
EPA leak detection regulations require testing of the portion of the tank system which routinely contains product.
California regulations require at least one test per month after routine product delivery or when the tank is filled to within 10% of the highest operating level during the previous month.

Marley Pump Co.
9650 Alden Street
Lenexa, KS 66215
Tel: (888) 262-7539

Evaluator: Ken Wilcox Associates
Tel: (816) 443-2494

Date of Evaluation: 04/02/91

Marley Pump Co.
Sonic Technology (ST) 1400-1800 Series Tank Monitoring System
ATG Automatic Tank Gauging Monitor, LLM Series Liquid Level Monitor
FMS Fuel Management Monitor
(Ultrasonic Probe)
AUTOMATIC TANK GAUGING SYSTEM

Certification:	Leak rate of 0.2 gph with $P_D=100\%$ and $P_{FA}=0\%$.
Leak Threshold:	0.1 gph. A system should not be declared tight if the test result indicates a loss or gain that equals or exceeds this threshold.
Applicability:	Gasoline, diesel, aviation fuel, and solvents.
Tank Capacity:	Maximum of 18,000 gallons. Tank must be between 50 and 95% full.
Waiting Time:	Minimum of 10 hours between delivery and testing. None between dispensing and testing. There must be no delivery during waiting time.
Test Period:	Minimum of 2 hours, 21 minutes. Test data are acquired and recorded by a computer. Leak rate is calculated from all data collected. There must be no dispensing or delivery during test.
Temperature:	Average for product is determined by a variable number of temperature sensors spaced at approximately 6-inch intervals.
Water Sensor:	Must be used to detect water ingress. Minimum detectable water level in the tank is 0.112 inch. Minimum detectable water level change is 0.011 inch.
Calibration:	Temperature sensors and probe must be checked and calibrated in accordance with manufacturer's instructions.
Comments:	Not evaluated using manifold tank systems. Tests only portion of tank containing product. As product level is lowered, leak rate in a leaking tank decreases (due to lower head pressure). Consistent testing at low levels could allow a leak to remain undetected. EPA leak detection regulations require testing of the portion of the tank system which routinely contains product. California regulations require at least one test per month after routine product delivery or when the tank is filled to within 10% of the highest operating level during the previous month. System was previously known as LT1 Automatic Product Level Monitor and was manufactured by Level Tech, Inc. (purchased by Marley 9/91).

Marley Pump Co.
9650 Alden Street
Lenexa, KS 66215
Tel: (888) 262-7539

Evaluator: ADA Technologies
Tel: (303) 792-5615

Date of Evaluation: 09/30/92

Marley Pump Co.
Sonic Technology (ST) 1400-1800 Series Tank Monitoring System
ATG Automatic Tank Gauging Monitor, LLM Series Liquid Level Monitor,
FMS Fuel Management Monitor
(Ultrasonic Probe)
AUTOMATIC TANK GAUGING SYSTEM

- Certification:** Leak rate of 0.1 gph with $P_D=99.9\%$ and $P_{FA}=0.01\%$.
- Leak Threshold:** 0.05 gph. A system should not be declared tight if the test result indicates a loss or gain that equals or exceeds this threshold.
- Applicability:** Gasoline, diesel, aviation fuel, fuel oils #4 and #6, and some solvents.
- Tank Capacity:** Maximum of 18,000 gallons.
Tank must be between 95 and 100% full.
- Waiting Time:** Minimum of 12 hours between delivery and testing.
None between dispensing and testing.
There must be no delivery during waiting time.
- Test Period:** Minimum of 2 hours, 21 minutes.
Test data are acquired and recorded by a computer.
Leak rate is calculated from all data collected.
There must be no dispensing or delivery during test.
- Temperature:** Average for product is determined by a variable number of temperature sensors spaced at approximately 6-inch intervals.
- Water Sensor:** Must be used to detect water ingress.
Minimum detectable water level in the tank is 0.112 inch.
Minimum detectable water level change is 0.011 inch.
- Calibration:** Temperature sensors and probe must be checked and calibrated in accordance with manufacturer's instructions.
- Comments:** Not evaluated using manifold tank systems. Tests only portion of tank containing product. As product level is lowered, leak rate in a leaking tank decreases (due to lower head pressure). Consistent testing at low levels could allow a leak to remain undetected. EPA leak detection regulations require testing of the portion of the tank system which routinely contains product.
If the 0.1 gph test is used as a tank tightness test there must be no water present in the backfill (groundwater must be below the bottom of the tank), the tank must be equipped with an overfill protection device, and the product level in the tank must be at the overfill protection device set point. Local agency pre-approval is required. To use this as a monthly test option see Title 23 CCR Section 2643(b)(2).
 System was previously known as LT1 Automatic Product Level Monitor and was manufactured by Level Tech, Inc. (purchased by Marley 9/91).

Marley Pump Co.
 9650 Alden Street
 Lenexa, KS 66215
 Tel: (888) 262-7539

Evaluator: ADA Technologies, Inc.
 Tel: (303) 792-5615

Date of Evaluation: 09/25/92

Marley Pump Co.**Red Jacket Electronics Combination High Level/Low Level Sensor
(RE400-179-5 to RE400-199-5), Hydrostatic Sensor (RE400-042-5)****LIQUID-PHASE INTERSTITIAL DETECTOR****Detector:**

Output type: qualitative
 Sampling frequency: continuous
 Operating principle: float switch

Test Results:

	unleaded gasoline		diesel fuel		water	
	<u>high</u>	<u>low</u>	<u>high</u>	<u>low</u>	<u>high</u>	<u>low</u>
RE400-179-5 to RE400-199-5						
Accuracy (%)	100	100	100	100	100	100
Detection time (sec)	<1	<1	<1	<1	<1	<1
Fall time (sec)	<1	<1	<1	<1	<1	<1
Lower detection limit (cm)	N/D*	3.80	N/D	4.26	N/D	3.53
RE400-042-5						
Accuracy (%)	100	100	100	100	100	100
Detection time (sec)	<1	<1	<1	<1	<1	<1
Fall time (sec)	<1	<1	<1	<1	<1	<1
Lower detection limit (cm)	30.42	4.93	30.22	4.61	29.93	4.19

*See glossary.

Specificity Results:

Activated: unleaded gasoline, synthetic gasoline, n-hexane, diesel fuel, jet-A fuel, toluene, xylene(s), water.

Comments:

EPA and many states require detection of 1/8 inch (0.32 cm) of product for groundwater monitoring.

Test procedures used were modified from U.S. EPA's "Standard Test Procedures for Evaluation of Leak Detection Methods: Liquid-Phase Out-of-Tank Liquid Product Detectors," March 1990.

Evaluator claims sensor will respond to any liquid once threshold has been exceeded.

For RE400-179-5 to RE400-199-5, model numbers and high level detection limit vary with length of sensor. Detector is reusable.

Marley Pump Co.
 9650 Alden Street
 Lenexa, KS 66215
 Tel: (888) 262-7539

Evaluator: Ken Wilcox Associates
 Tel: (816) 443-2494

Date of Evaluation: 06/01/95

Marley Pump Co.**Red Jacket Electronics RE400-058-5, RE400-059-5, RE400-147-5, RE400-148-5, RE400-111-5, RE400-203-5, RE400-204-5, RE400-180-5****LIQUID-PHASE INTERSTITIAL DETECTOR****Detector:**

Output type: qualitative
 Sampling frequency: continuous
 Operating principle: various: float switch, except RE400-203-5 (electrical conductivity and optical), RE400-204-5 (conductive polymer), and RE400-180-5 (optical)

Test Results:

	unleaded gasoline	diesel fuel	water
RE400-058-5, RE400-059-5, RE400-147-5, RE400-148-5 Overfill Sensor			
Accuracy (%)	100	100	100
Detection time (sec)	<1	<1	<1
Fall time (sec)	<1	<1	<1
Lower detection limit (cm)	2.97	2.82	2.57
RE400-111-5 Sump Sensor			
Accuracy (%)	100	100	100
Detection time (sec)	<1	<1	<1
Fall time (sec)	<1	<1	<1
Lower detection limit (cm)	3.60	3.41	3.20
RE400-203-5 Optical Liquid Discrimination Sensor			
Accuracy (%)	100	100	100
Detection time (sec)	<1	<1	<1
Fall time (sec)	<1	<1	<1
Lower detection limit (cm)	1.17	1.12	1.10
RE400-204-5 Dispenser Pan Monitor			
Accuracy (%)	100	100	100
Detection time (hr:min:sec)	<00:30:00	<02:00:00	<00:00:01
Fall time (hr:min:sec)	<01:20:00	1-2 days	<00:00:01
Lower detection limit (cm)	0.44	0.44	1.08
RE400-180-5 Liquid Refraction Sensor			
Accuracy (%)	100	100	100
Detection time (sec)	<1	<1	<1
Fall time (sec)	<1	<1	<1
Lower detection limit (cm)	1.17	1.12	1.10

Specificity Results:

Activated: unleaded gasoline, synthetic gasoline, n-hexane, diesel fuel, jet-A fuel, toluene, xylene(s), water.

Comments:

EPA and many states require detection of 1/8 inch (0.32 cm) of product for groundwater monitoring.

Test procedures used were modified from U.S. EPA's "Standard Test Procedures for Evaluation of Leak Detection Methods: Liquid-Phase Out-of-Tank Liquid Product Detectors," March 1990.

Evaluator claims sensors will respond to any liquid once threshold has been exceeded.

For RE400-179-5 to RE400-199-5, model numbers and high level detection limit vary with length of sensor.

For RE400-204-5, after exposure to diesel, sensor reading may not return to pre-contaminated level.

Detectors are reusable.

Marley Pump Co.
 9650 Alden Street
 Lenexa, KS 66215
 Tel: (888) 262-7539

Evaluator: Ken Wilcox Associates
 Tel: (816) 443-2494

Date of Evaluation: 06/01/95

Marley Pump Co.**Red Jacket PPM 4000 with Optical Liquid Discrimination Sensor****LIQUID-PHASE INTERSTITIAL DETECTOR****Detector:**

Output type: qualitative
 Sampling frequency: continuous
 Operating principle: optical sensor

Test Results: *

	unleaded <u>gasoline</u>	synthetic <u>fuel</u>	diesel <u>fuel</u>	heating <u>oil #2</u>	<u>water</u>
Accuracy (%)	100	100	100	100	100
Response time (min)	2.19	2.20	1.93	2.23	2.81
Recovery time (min)	< 1	< 1	< 1	< 1	< 1
Product activation height (cm)	1.08	1.10	1.03	1.07	1.20
Lower detection limit (cm)	0.30	N/D**	N/D	N/D	N/D

*At a flow rate of 0.13 gal/hr in a 4.8 cm diameter test chamber.

** See glossary.

Specificity Results:

Activated: unleaded gasoline, diesel fuel, synthetic fuel, heating oil #2, water.

Manufacturer's specifications:

Manufacturer's instructions do not specify procedures or schedules for maintenance or calibration.

Comments:

EPA and many states require detection of 1/8 inch (0.32 cm) of product for groundwater monitoring.

Detector is listed as interstitial due to intended use.

Test procedures used were Carnegie Mellon Research Institute's "Test Procedures for Third Party Evaluation of Leak Detection Methods: Point Sensor Liquid Contact Leak Detection Systems": Final Report - November 11, 1991.

Evaluation lists all PPM, RLM, and ST models, including the Multiplexer Unit; however, evaluation procedures were performed using model PPM 4000.

Detector is reusable.

Marley Pump Co.
 9650 Alden Street
 Lenexa, KS 66215
 Tel: (888) 262-7539

Evaluator: Carnegie Mellon Research Institute
 Tel: (412) 268-3495

Date of Evaluation: 04/28/92

Mine Safety Appliances

Tankgard
P/N 481532 S/N 03095

VAPOR-PHASE OUT-OF-TANK PRODUCT DETECTOR**Detector:**

Output type: quantitative
 Sampling frequency: continuous
 Operating principle: metal oxide semiconductor

Test Results:

	<u>benzene</u>	<u>2-methylbutane</u>
Accuracy (%)	100	100
Detection time (sec)	5	16
Fall time (min:sec)	04:12	04:42
Lower detection limit (ppm)	12.5	12.5

Specificity Results:

Activated (100%): benzene, n-butane, n-hexane, 2-methylpentane, toluene, isobutane.

Manufacturer's specifications:

Maximum Wire Distance: 500 ft using 18 AWG
 Response Time: 30 seconds
 Recover Time: 1 minute maximum
 Sensor Life: 2 year warranty

Mine Safety Appliances
 P. O. Box 427
 Pittsburgh, PA 15230
 Tel: (80 0) 672-6478

Evaluator: Carnegie Mellon Research Institution
 Tel: (412) 268-3495

Date of Evaluation: 03/26/91

Mine Safety Appliances**Tankgard VIII
P/N 488803 S/N 00389****VAPOR-PHASE OUT-OF-TANK PRODUCT DETECTOR****Detector:**

Output type: quantitative
Sampling frequency: continuous
Operating principle: metal oxide semiconductor

Test Results:

	<u>benzene</u>	<u>2-methylbutane</u>
Accuracy (%)	100	100
Detection time (sec)	5	16
Fall time (min:sec)	04:12	04:42
Lower detection limit (ppm)	12.5	12.5

Specificity Results:

Activated (100%): benzene, n-butane, n-hexane, 2-methylpentane, toluene, isobutane.

Manufacturer's specifications:

Maximum Wire Distance: 500 ft using 18 AWG.
Response Time: 30 seconds.
Recover Time: 1 minute maximum.
Sensor Life: 2 year warranty.

Mine Safety Appliances
P. O. Box 427
Pittsburgh, PA 15230
Tel: (800) 672-6478

Evaluator: Carnegie Mellon Research Institution
Tel: (412) 268-3495

Date of Evaluation: 03/28/91

Omntec/Electro Levels Mfg., Inc.

**OEL 8000
(Magnetostrictive Probe)**

AUTOMATIC TANK GAUGING SYSTEM

- Certification:** Leak rate of 0.2 gph with $P_D=99.9\%$ and $P_{FA}=0.1\%$.
- Leak Threshold:** 0.1 gph. A system should not be declared tight if the test result indicates a loss or gain that equals or exceeds this threshold.
- Applicability:** Gasoline, diesel, aviation fuel, fuel oil #4, waste oil, and solvents.
Other liquids may be tested after consultation with the manufacturer.
- Tank Capacity:** Maximum of 15,000 gallons.
Tank must be between 50 and 95% full.
- Waiting Time:** Minimum of 6 hours, 30 minutes between delivery and testing.
There must be no delivery during waiting time.
- Test Period:** Minimum of 4 hours.
Test data are acquired and recorded by a computer.
Leak rate is calculated from data determined to be valid by statistical analysis.
There must be no dispensing or delivery during test.
- Temperature:** Average for product is determined by a minimum of 5 thermistors.
- Water Sensor:** Must be used to detect water ingress.
Minimum detectable water level in the tank is 0.055 inch.
Minimum detectable change in water level is 0.011 inch.
- Calibration:** Thermistors and probe must be checked and calibrated in accordance with manufacturer's instructions.
- Comments:** Not evaluated using manifold tank systems.
Tests only portion of tank containing product.
As product level is lowered, leak rate in a leaking tank decreases (due to lower head pressure). Consistent testing at low levels could allow a leak to remain undetected.
EPA leak detection regulations require testing of the portion of the tank system which routinely contains product.
California regulations require at least one test per month after routine product delivery or when the tank is filled to within 10% of the highest operating level during the previous month.

Omntec/Electro Levels Mfg., Inc.
1993 Pond Rd.
Ronkonkoma, NY 11779
Tel: (516) 981-2001

Evaluator: Ken Wilcox Associates
Tel: (816) 443-2494

Date of Evaluation: 01/17/96

Omntec/Electro Levels Mfg., Inc.**OEL 8000
(Magnetostrictive Probe)****AUTOMATIC TANK GAUGING SYSTEM**

- Certification:** Leak rate of 0.1 gph with $P_D=97.8\%$ and $P_{FA}=2.2\%$.
- Leak Threshold:** 0.05 gph. A system should not be declared tight if the test result indicates a loss or gain that equals or exceeds this threshold.
- Applicability:** Gasoline, diesel, aviation fuel, fuel oil #4, waste oil, solvents.
Other liquids may be tested after consultation with the manufacturer.
- Tank Capacity:** Maximum of 15,000 gallons.
Tank must be between 50 and 95% full.
- Waiting Time:** Minimum of 6 hours, 30 minutes between delivery and testing.
There must be no delivery during waiting time.
- Test Period:** Minimum of 4 hours.
Test data are acquired and recorded by a computer.
Leak rate is calculated from data determined to be valid by statistical analysis.
There must be no dispensing or delivery during test.
- Temperature:** Average for product is determined by a minimum of 5 thermistors.
- Water Sensor:** Must be used to detect water ingress.
Minimum detectable water level in the tank is 0.055 inch.
Minimum detectable change in water level is 0.011 inch.
- Calibration:** Thermistors and probe must be checked and calibrated in accordance with manufacturer's instructions.
- Comments:** Not evaluated using manifold tank systems.
Tests only portion of tank containing product.
As product level is lowered, leak rate in a leaking tank decreases (due to lower head pressure). Consistent testing at low levels could allow a leak to remain undetected.
EPA leak detection regulations require testing of the portion of the tank system which routinely contains product.
If the 0.1 gph test is used as a tank tightness test there must be no water present in the backfill (groundwater must be below the bottom of the tank), the tank must be equipped with an overfill protection device, and the product level in the tank must be at the overfill protection device set point. Local agency pre-approval is required. To use this as a monthly test option see Title 23 CCR Section 2643(b)(2).

Omntec/Electro Levels Mfg., Inc.
1993 Pond Rd.
Ronkonkoma, NY 11779
Tel: (516) 981-2001

Evaluator: Ken Wilcox Associates
Tel: (816) 443-2494

Date of Evaluation: 01/17/96

Omntec/Electro Levels Mfg., Inc.**L-R-1, LS-ASC, PDS-ASC, PDWS-1, PDWF-1****LIQUID-PHASE INTERSTITIAL DETECTOR****Detector:**

Output type: qualitative
 Sampling frequency: continuous
 Operating principle: all: refractive index of liquids; PDS-ASC, PDWS-1, and PDWF-1: also electrical conductivity

Test Results:

	L-LL-R-1 (low level)			L-LL-R-1 (high level)		
	<u>unleaded gasoline</u>	<u>diesel fuel</u>	<u>water</u>	<u>unleaded gasoline</u>	<u>diesel fuel</u>	<u>water</u>
Accuracy (%)	100	100	100	100	100	100
Detection time (sec)	< 1	< 1	< 1	< 1	< 1	< 1
Fall time (sec)	< 1	< 1	< 1	< 1	< 1	< 1
Lower detection limit (cm)	6.63	6.53	6.45	21.7	21.8	21.7

	PDWS-1			PDWF-1		
	<u>unleaded gasoline</u>	<u>diesel fuel</u>	<u>water</u>	<u>unleaded gasoline</u>	<u>diesel fuel</u>	<u>water</u>
Accuracy (%)	100	100	100	100	100	100
Detection time (sec)	< 1	< 1	< 1	< 1	< 1	< 1
Fall time (sec)	< 1	< 1	< 1	< 1	< 1	< 1
Lower detection limit (cm)	1.93	1.85	1.63	1.60	1.67	1.02

	PDS-ASC/LS-ASC		
	<u>unleaded gasoline</u>	<u>diesel fuel</u>	<u>water</u>
Accuracy (%)	100	100	100
Detection time (sec)	< 1	< 1	< 1
Fall time (sec)	< 1	< 1	< 1
Lower detection limit (cm)	2.24	2.11	1.42

Specificity Results:

Activated: unleaded gasoline, synthetic gasoline, n-hexane, diesel fuel, jet-A fuel, toluene, xylene(s), water.

Manufacturer's specifications:

LS and PD series responds to any liquid with an index of refraction different than air. PD series responds to any conducting liquid.

Comments:

EPA and many states require detection of 1/8 inch (0.32 cm) of product for groundwater monitoring.

Detectors are listed as interstitial due to intended use.

Test procedures used were modified from EPA's "Standard Test Procedures for Evaluating Leak Detection Methods: Liquid-Phase Out-of-Tank Product Detectors," March 1990, and EPA's "Standard Test Procedures for Evaluating Leak Detection Methods: Non-Volumetric Tank Tightness Test Methods," March 1990.

Detector is reusable.

Omntec/Electro Levels Mfg., Inc.
 1993 Pond Rd.
 Ronkonkoma, NY 11779
 Tel: (516) 467-5787

Evaluator: Ken Wilcox Associates
 Tel: (816) 443-2494

Date of Evaluation: 06/12/93

One Plus Corp.**Leak Edge
Models 100-3001, 100-4001****LIQUID-PHASE OUT-OF-TANK PRODUCT DETECTOR****Detector:**

Output type: qualitative
 Sampling frequency: continuous
 Operating principle: product permeable

Test Results:

	unleaded <u>gasoline</u>	synthetic <u>gasoline</u>
Accuracy (%)	100	100
Detection time (hr:min:sec)	00:05:41	00:05:14
Fall time (hr:min:sec)	00:30:39	00:18:36
Lower detection limit (cm)	0.02	0.02

Specificity Results:

Activated: unleaded gasoline, synthetic gasoline, n-hexane, diesel fuel, jet-A fuel, toluene, xylene(s).

Manufacturer's specifications:

Operating temperatures: Sensor is -40 degrees C to 74 degrees C; Monitor Module is -20 degrees C to 49 degrees C.

Comments:

EPA and many states require detection of 1/8 inch (0.32 cm) of product for groundwater monitoring. Detector is reusable.

One Plus Corp.
 1955 Shermer Rd., Suite 100
 Northbrook, IL 60062
 Tel: Not Available

Evaluator: Underwriters Laboratories Inc.
 Tel: (847) 272-8800

Date of Evaluation: 12/17/91